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(34) MOUNTING SYSTEM FOR AUTOMOBILE SEATS

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No. OF CLAIMS 8

1. An automobile which comprises:

transversely spaced apart side walls;

first and second seats extending transversely within said automobile between said side walls and each including a seat portion with a top surface defined by transverse edges and rearwardly adjacent thereto an upstanding back rest with first and second surfaces each defined by mutually spaced apart transverse edges;

mounting means associated with said seats for retaining said seats in position within said automobile with said top surface of each said seat portion of each said seat facing upwardly and with said first surface of each said back rest facing a respective one of said seat portions and rearwardly adjacent thereto, said mounting means being adapted to permit removal from said automobile of at least three seat-components selected from said seat portions and said back rests of said seats; and

releasable connecting means associated with at least one of said seat components for releasably interconnecting said three seat components in generally horizontal disposition with said transverse edges of adjacent ones thereof in mutual juxtaposition and with said top surfaces and said first surfaces thereof facing upwardly to form a mattress.

2. An automobile as claimed in Claim 1, in which said mounting means is adapted to permit removal from said automobile of said seat portions and said back rests of both said seats and in which said connecting means are adapted releasably to interconnect all such four seat components in generally horizontal disposition with said transverse edges of adjacent ones thereof in mutual juxtaposition and with said top surfaces of said seat portions and said first surfaces of said back rests facing upwardly to form said mattress.

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3. An automobile as claimed in Claim 2, in which said back rest of each said seat is defined by upper and lower transverse edges, in which said seat portion of each said seat is defined by front and rear transverse edges, in which said connecting means are adapted releasably to interconnect said back rest and said seat portion of each said seat with one of said front and rear transverse edges of said seat portion in juxtaposition with said lower transverse edge of said back rest, and in which said connecting means includes retractable connectors for retaining said seat portions of both said seats with transverse edges thereof in mutual juxtaposition.

4. An automobile as claimed in Claim 3, in which said retractable connectors are mounted on said seat portion of at least one of said seats for movement between a retracted position generally within said seat portion and an extended position for releasable coupling with said seat portion of the other said seat.

5. An automobile as claimed in Claim 4 and in which said retractable couplings are pivotally mounted on said seat portion of one said seat for movement between retracted and extended positions thereof.

6. An automobile as claimed in Claim 5 and which additionally comprises releasable holding means for releasably retaining said retractable couplings in said retracted positions thereof beneath said seat portion of a respective one of said seats.

7. An automobile as claimed in Claim 5 and which said retractable couplings extend, in their extended positions, for releasable engagement with a frame member of an adjacent one of said seat portions of said seats when said seat portions are disposed with transverse edges thereof in mutual juxtaposition.

8. An automobile as claimed in Claim 2 and in which each said back rest comprises a major lower portion and a minor upper portion movably mounted thereon.



## BACKGROUND OF THE INVENTION

The present invention relates to automobile body structures and more particularly to the provision of means in an automobile body structure so that one or more seats of the automobile can more effectively be used for sleeping or resting by the driver or passengers of the vehicle.

Many proposals have heretofore been made concerning the provision of automobile seats which can be used as mattresses or converted into mattresses for sleeping purposes but many of the previous proposals have involved the use of particularly complex and consequently expensive structures.

It has also been proposed, particularly with regard to permitting the drivers of trucks to sleep in the cabs of their vehicles, to provide transversely extensible housings on the doors of such truck cabs. Such housings have been designed to extend transversely outwardly beyond the outer panels of the doors of the truck and internally to accommodate the driver's head and feet while he is resting on the bench-type seat in the truck cab. When not in use, such housings are retracted into the doors, for example, telescopically or hingedly, so that they do not project transversely outwardly from the vehicle when the latter is being driven. With arrangements of this particular type, it has been possible to provide temporary additional sleeping length for a driver even in the relatively narrow widths available in the cabs of many trucks. Such previously proposed arrangements have, however, suffered from the disadvantages that they cannot readily be applied to automobile body structures particularly from the point of view of providing a satisfactory external appearance to the outer panels of the doors on which such structures are mounted and that they provide only limited additional space.

It is accordingly a general object of this invention

to provide an automobile comprising a transversely disposed seat including a seat portion and a back rest and in which such a seat can be moved between an extended disposition for sleeping purposes and a retracted disposition when the automobile is to be driven.

10 More particularly, it is an important object of this invention to provide an automobile body structure in which a seat is transversely disposed between the side walls of the body structure and in which the seat portion and back rest of such a seat can be moved into an extended position when so required in a simple manner to provide a relatively large surface on which a person can sleep.

Another object of this invention in accordance with one preferred feature thereof is to permit the additional use of the space available within the side walls and doors of an automobile body structure without restricting the operation of wind-down windows provided in such side walls or doors.

20 Yet another object of this invention in accordance with another preferred feature thereof is to permit the movement of the seat of an automobile into its extended disposition even in an automobile in which there is insufficient space for the seat portion and the back rest of such a seat to be disposed generally horizontally in transverse edge juxtaposition with each other.

30 A further object of this invention is to provide a construction for a seat of an automobile and for a mounting system for such a seat, and which construction can be applied to a wide range of styles and sizes of automobile body structures.

Another object of this invention in accordance with another optional feature thereof is to provide a particularly

useful type of extensible housing in at least one side wall of an automobile body structure to provide an even greater sleeping area when a seat of such an automobile is disposed in its extended position.

Other objects of the invention will become apparent as the description herein proceeds.

#### SUMMARY OF THE INVENTION

10 This invention involves the provision in an automobile in which the seat portion of a seat thereof has a top surface and in which the back rest of that seat has a surface which faces forwardly relative to the automobile when that seat is disposed in a retracted rearward position thereof and at least a portion of which faces upwardly to provide a generally horizontal extension of the top surface of the seat portion when the seat is moved into its extended forward position.

20 Broadly, the present invention provides an automobile which comprises a body structure including transversely spaced apart side walls; a transversely disposed seat extending between said side walls and in turn comprising a seat portion with a top surface and an upstanding back rest with a front surface; a first mounting means for retaining said seat portion of said seat in transverse generally horizontal disposition between said side walls with said top surface thereof facing upwardly; a second mounting means for releasably retaining said back rest of said seat in a transverse and upstanding disposition between said side walls, rearwardly of said seat portion and with said front surface thereof facing forwardly; and a third mounting means for releasably retaining said seat portion and at least a portion of said back  
30 rest of said seat in transverse disposition between said side walls with said front surface of such a portion of said back rest of said seat forming a generally horizontal extension of

said top surface of said seat portion.

10 In accordance with a particularly useful feature of this invention, additional sleeping surface is obtained by providing an upwardly facing supporting surface in a recess which is in turn formed in at least one side wall of the automobile body. Such recesses can, for example be provided in doors which are hingedly mounted in a conventional manner in the side walls of the automobile body in the manner described in my copending Canadian Patent Application Serial No. 089,431, filed July 29, 1970 and entitled "Convertible Seat Bed for Automobiles".

20 In order to provide an even larger area for a person lying on the seat of an automobile in accordance with this invention, upwardly facing supporting surfaces forming transverse extensions of the seat are provided in recesses in housings which are in turn hingedly mounted in side walls or doors of the automobile at the transverse ends of the seat in accordance with the teaching of my copending Canadian Patent Application No. 122,289, filed September 8, 1971 and entitled "Automobile Body Structure Incorporating Hinged Housing". When such housings are moved outwardly into their extended positions, cushion members can be disposed at the ends of the seat so that the top surfaces of those cushion members and the upwardly facing supporting surfaces within the housing recesses together provide essentially continuous transverse extensions of the top surface of the seat when that seat is moved into its forward extended position.

30 Other features and advantages of the invention will become apparent as the description herein proceeds.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described merely by way of illustration with reference to the accompanying drawings in

which:

Figure 1 is a perspective view of the interior of one embodiment of a four-door automobile constructed in accordance with this invention and showing both the front and rear seats of that automobile disposed in their extended forward positions for sleeping purposes;

10 Figure 2 is a longitudinal vertical sectional view through the automobile of Figure 1 when taken as indicated by the arrows 2-2 of that figure;

Figure 3 is a longitudinal vertical sectional view similar to that of Figure 2 but showing both the front and rear seats in their retracted rearward positions;

20 Figure 4 is a perspective view of the front seat of the automobile of Figure 1 with certain parts cut away and others in section and showing the seat in its retracted rearward position for driving purposes;

Figure 5 is an enlarged fragmentary vertical sectional view through one end of the back rest of the front seat of the automobile shown in the preceding figures when taken as indicated by the arrows 5-5 of Figure 4 and showing the upper portion of that back rest pivoted partially forwardly;

30 Figure 6 is an enlarged fragmentary vertical sectional view similar to that of Figure 5 but taken as indicated by the arrows 6-6 of Figure 4 and also showing the upper portion of the back rest of the front seat pivoted par-



tially forwardly;

Figure 7 is an enlarged and exploded perspective view of the hinge mechanism shown in Figure 5;

Figure 8 is a perspective view similar to that of Figure 4 and again partly in section but showing the rear seat of the automobile of the preceding figures as well as showing that seat in its retracted rearward position and two pivotally mounted arm rests which are usefully provided in this particular embodiment of an automobile in accordance with the present invention;

Figure 9 is an enlarged vertical sectional view similar to that of Figure 5 but taken through the rear seat shown in Figure 8 and showing an upper portion of the back rest of the rear seat in a rearwardly pivoted position thereof;

Figure 10 is a side elevation of one of the pivotally mounted arm rests shown in Figure 8 with certain parts cut away or shown in phantom outline and showing details of a mechanism by means of which that arm rest is movably and pivotally mounted on the automobile body, a lowered position of the arm rest also being shown in phantom outline;

Figure 11 is a sectional view through the arm rest and mounting shown in Figure 10 when taken as indicated by the arrows 11-11 of that figure;

Figure 12 is a sectional view through the arm rest and mounting shown in Figure 10 when taken as indicated by the arrows 12-12 of that figure

and showing details of a locking pin provided for holding the arm rest in a desired one of raised and lowered positions thereof;

Figure 13 is an exploded perspective view partly in section showing details of the pivotal mounting of the arm rest shown in Figure 10;

Figure 14 is a perspective view showing the seats removed from the automobile of Figures 1 to 3 and such seats interconnected to form a camping mattress;

Figure 15 is a vertical sectional view through the mattress shown in Figure 14 when taken as indicated by the arrows 15-15 of that figure;

Figure 16 is an enlarged and fragmentary perspective view of one of the retractable fastening devices used for detachably interconnecting the seat portions and back rests to form the mattress shown in Figure 14 and showing that fastening device in its closed or locking position;

Figure 17 is a plan view of the fastening device of Figure 16 also showing that device in its locking position;

Figure 18 is an end elevation of the fastening device of Figures 16 and 17 when taken as indicated by the arrows 18-18 of the former figure and showing in solid lines the device in its locking position and, in phantom outline, in its released position;

Figure 19 is a perspective view of the interior of one embodiment of a two-door automobile in

accordance with this invention and generally similar to the view of Figure 1, the front seat, however, being shown in phantom outline;

Figure 20 is a fragmentary vertical and transverse sectional view through a further alternative embodiment of an automobile in accordance with this invention and showing, in one of two lowered positions thereof, an arm rest which is movably mounted on one of the doors of the automobile;

Figure 21 is a fragmentary vertical and transverse sectional view similar to that of Figure 20 but showing the arm rest in a second one of its lowered positions;

Figure 22 is a fragmentary vertical and transverse sectional view similar to those of Figures 20 and 21 but showing the arm rest in an elevated position thereof;

Figure 23 is a fragmentary vertical and transverse sectional view similar to those of Figures 20 to 22 but showing the provision of a hingedly mounted housing within the door of an automobile in accordance with another feature of this invention, such housing being shown in a retracted position thereof; and

Figure 24 is a fragmentary vertical and transverse sectional view similar to that of Figure 23 but showing the housing in its extended position.

#### DESCRIPTION OF PREFERRED EMBODIMENTS

Reference will first be made herein to Figures 1 to 18 of the accompanying drawings which figures illustrate one

embodiment of the present invention as applied to the construction of a four-door automobile. The alternative embodiments of the invention as illustrated in the remaining figures of the drawings will then be described.

10 The four-door automobile generally indicated at 36 in Figures 1 to 3 of the drawings comprises transversely spaced apart side walls, one of which is generally indicated at 37 and in which there are mounted in a conventional manner front and rear doors generally indicated at 39 and 40 respectively. A floor indicated at 41 extends between the side walls 37. A front seat generally indicated at 42 and a rear seat generally indicated at 43 are disposed transversely within the automobile 36 between the front and rear doors 39 and 40 respectively thereof.

The front seat 42 includes a seat portion generally indicated at 44 and a back rest generally indicated at 45. Similarly, the rear seat 43 includes a seat portion and a back rest generally indicated at 46 and 47 respectively.

20 The front seat 42 includes longitudinally extending runners 48 and 49 which are mounted on longitudinal tracks 50 and 51 respectively in a conventional manner to allow the position of the seat to be adjusted forwardly or rearwardly as desired by the driver of the automobile, a releasing handle 52 (Figure 4) being provided to allow the runners 48 and 49 to be released for manual adjustment of the position of the seat. Since the mounting of the runners 48 and 49 on the tracks 50 and 51 respectively is conventional, it will not be described in greater detail herein.

30 The seat portion 44 of the front seat 42 has a generally conventional construction including springs 54, resilient foam padding 55 and a covering 56 of fabric or other suitable material. The seat portion 44 has a metal frame construction

including a front transverse angle member 57, a rear transverse angle member 58 and cross members 59, two of which are visible in Figure 4 and on which the springs 54 are supported. The seat portion 44 has a top surface generally indicated at 60, a front transverse edge surface 61 and a rear transverse edge surface 62.

10 In a manner yet to be explained, the seat portion 44 of the front seat 42 is mounted so that it can be moved forwardly and rearwardly between the positions shown in Figures 2 and 3 and as indicated by the arrows A and B in those figures. To permit such movement of the seat portion 44 between the positions shown in Figures 2 and 3, upstanding guide channels generally indicated at 65 and 66 are provided on the top surfaces of the aforementioned runners 49 and 48 respectively. Each of the guide channels 65 and 66 includes upper and lower flanges 67 and 68 respectively which are integrally formed with an upstanding web 69. At the forward end of each of the guide channels 65 and 66, the upper flange 67 and the upstanding web 69 thereof are cut away and the lower flange 20 68 is bent upwardly to form an upstanding tongue 70.

Slots or openings 71 are provided through the horizontal flange 72 of the front transverse angle member 57 of the frame of the seat portion 44 and such slots 71 receive respective ones of the aforementioned tongues 70 when the seat portion 44 is disposed in its retracted or rearward position as shown in Figures 3 and 4 for the purpose of preventing undesired forward movement of the seat portion out of its rearward position.

30 Two of the cross members 59 of the frame of the seat portion 44 are provided with upstanding brackets 74 on which rollers 75 are journaled, the rollers 75 being disposed between the upper and lower flanges 67 and 68 respectively of

respective ones of the guide channels 65 and 66 so as to guide the seat portion 44 during its movement between its forward and rearward positions.

When the seat portion 44 is moved forwardly, engagement of the rollers 75 with respective ones of the tongues 70 at the forward ends of the guide channels 65 and 66, which tongues constitute stop members, prevents further forward movement of the seat portion 44 beyond its forwardmost position. For a reason which will be more readily understood as the description herein proceeds, the upper flanges 67 of the guide channels 65 and 66 are cut away generally centrally thereof as indicated at 76 to allow elevation and removal from the automobile of the seat portion 44, the guide rollers 75 then passing through such cut away portions 76.

Since the top surface 60 of the seat portion 44 will normally slope downwardly and rearwardly when that seat portion is disposed in its rearward position as shown in Figures 3 and 4 but should preferably be generally horizontal when the seat portion is disposed in its forward position as shown in Figures 1 and 2, generally triangular sectioned cushions 78 are provided at the forward ends of the guide channels 65 and 66, the front transverse angle member 57 resting on those cushions 78 and being elevated to the desired extent thereby when the seat portion 44 is in its rearward position and the tongues 70 are received in respective ones of the slots 71 in the flange 72 of the frame member 57.

The back rest 45 of the front seat 42 is guided in a manner yet to be described between side guide panels 81 and 82 which are mounted on the transverse upright end edges of a transversely extending panel 83 and are usefully formed with forwardly extending arms 84 (Figure 4) between which the seat portion 44 is disposed when in its rearward retracted position.

The back rest 45 is mounted in a manner yet to be described for movement between the upstanding rearward position shown in Figures 3 and 4 and a lowered forward position as shown in Figures 1 and 2. The arms 84 are usefully formed with inwardly directed flanges (not shown) to support the back rest 45 when it is in its lowered or extended forward position. The panel 83 is usefully provided on its front surface with resilient padding generally indicated at 85 for a reason which will become apparent as the description herein proceeds. At its lower edge, the panel 83 curves forwardly as indicated at 86 and is secured to the rear ends of the runners 48 and 49.

The back rest 45 has a two-part construction and includes a major lower portion 88 and a smaller upper portion 89 which is hingedly mounted on the lower portion 88 in a manner yet to be described. The back rest 45 has a front surface generally indicated at 90 and which faces forwardly when that back rest 45 is disposed in its upstanding rearward or retracted position as shown in Figures 3 and 4 and which faces upwardly and forms a generally horizontal rearward extension of the top surface 60 of the seat portion 44 when that seat portion 44 is disposed in its extended forward position and when the back rest 45 is disposed in its lowered position as will be readily understood by reference to Figures 1 and 2.

The lower portion 88 of the back rest 45 has an upper transverse edge surface 91 and a lower transverse edge surface 92. It has a metal frame construction including an upper transverse angle member 93, a lower transverse angle member 94 and cross members 95. The lower portion 88 of the back rest 45 also includes springs 96 and resilient foam padding 97, the springs 96 being supported on the cross members 95. End frame members 98 are provided at the upper transverse edge surface 91 for mounting the upper portion 89 of the back

rest 45 on the lower portion 88. Recesses (not shown) which extend between the upper and lower edge surfaces 91 and 92 respectively are usefully provided in the rear surface of the lower portion 88 of the back rest 45 to receive the guide channels 65 and 66 when that back rest 45 is disposed in its lowered forward position as will be more readily understood as the description herein proceeds.

10 The upper portion 89 of the back rest 45 has a smaller thickness in the forward-rearward direction than the lower portion 88 and comprises a metal frame construction including upper and lower transverse angle members 99 and 100 respectively and cross members 101, and resilient foam padding 102. The undersurface of the upper portion 89 of the back rest 45 is indicated by the legend 103, while its front surface is indicated by the legend 104. End frame members 105 extend forwardly from the lower transverse angle member 100 at each end of the upper portion 89.

20 The upper and lower portions 89 and 88 respectively of the back rest 45 have an outer fabric covering generally indicated at 106 and which is usefully continuous through the front surfaces 90 and 104 of the upper and lower portions 89 and 88 respectively to provide an unbroken appearance to the front surface of the back rest 45 when that back rest 45 is disposed in its rearward position as shown in Figures 3 and 4.

30 A resiliently padded cross-head or bolster generally indicated at 107 and having a metal frame construction which in turn includes a front and rear, upper transversely extending angle members 108 and 109 respectively and a rear lower transversely extending angle member 110 is secured at its ends to the aforementioned side guide panels 81 and 82 so as to be disposed rearwardly of the upper portion 89 of the back rest



45 when that back rest 45 is disposed in its raised rearward position. Cross members 111 extend between the angle members 108, 109 and 110. The front surface of the bolster 107 is indicated by the legend 112 while its undersurface is indicated by the legend 113, the horizontal flange of the rear lower angle member 110 being indicated by the legend 114, the resilient foam padding being indicated by the legend 115 and the vertical flange of the front upper transverse member 108 being indicated by the legend 116. A fabric covering 117 is also provided.

The vertical flange 116 of the front upper angle member 108 of the bolster 107 is formed near its ends with rectangular openings 118, each of which receives a spring clip fastener 119 provided on a respective end of the upper transverse angle member 99 of the upper portion 89 of the back rest 45 for the purpose of releasably retaining that portion 89 in the position shown in Figure 3 and as will be more readily understood by reference to Figure 6.

Openings 120 are provided in the horizontal flange 114 of the lower transversely extending angle member 110 of the bolster 107 for receiving locating pins 121 which extend upwardly from the upper transverse angle member 93 of the lower portion 88 of the back rest 45 when that back rest is disposed in its raised rearward position as particularly shown in Figures 3 and 6.

Two spring metal clips 122 are secured, for example, by welding, to the transverse panel 83 and extend forwardly therefrom so as to be received in aligned recesses 123 formed in the horizontal flange of the lower transverse angle member 94 of the frame of the lower portion 88 of the back rest 45 when that back rest 45 is in its raised rearward position as will be readily understood by reference to Figures 3 and 5.

The manner in which the upper portion 89 of the back rest 45 is hingedly mounted on the lower portion 88 thereof will now be explained. For this purpose, hinges generally indicated at 126 are provided beneath the fabric covering 106 at both transverse ends of the back rest 45. One such hinge 126 is shown in greater detail in Figures 5 and 7 from which it will be seen that such hinge comprises an upper L-shaped hinge leaf 127 which is secured to a respective end frame member 105 of the upper portion 89 of the back rest 45 by screws 128. The hinge 126 also includes a straight lower hinge leaf 129 which is secured to the respective end frame member 98 of the lower portion 88 of the back rest 45 by screws 130. A shoulder bolt 131 extends through the hinge leaves 127 and 129 and is secured in position by a nut 132. A collar or sleeve 133 is disposed between the hinge leaves 127 and 129 and a helical torsion spring 134 is disposed around the sleeve 133. Arms 135 and 136 of the spring 134 are formed with hook-like end portions 137 and 138 respectively, which arms engage respective ones of the hinge leaves 127 and 129 to urge the upper portion 89 of the back rest 45 to rotate clockwise relative to the lower portion 88 thereof as viewed in Figures 5 and 6. Washers 139 and 140 are provided on the bolt 131.

Referring again to Figure 1 of the accompanying drawings, it will be noted therefrom that the nearside front door 39 is shown in that figure as having a relatively large recess 144 formed therein and within which recess a cushion member generally indicated at 145 is provided. The cushion member 145 has an upwardly facing top surface 146 which forms a transversely outward extension of the top surface 60 of the seat portion 44 of the front seat 42 as well as of the front surface 90 of the lower portion 88 of the back rest 45 when that back rest is disposed in its lowered forward position as

shown in Figures 1 and 2. A similar cushion member generally indicated at 147 and having a top surface 148 is shown in Figure 1 as being provided in a similar recess in the front door on the driver's side of the automobile 36 to provide a corresponding transverse extension of the top surfaces of the seat portion 44 and of the lower portion 88 of the back rest 45 of the front seat 42 on the opposite transverse side of the automobile.

10 Having described the construction of the front seat 42 of the automobile 36, the manner in which that seat is moved between its two positions will now be explained. In the driving position shown in Figures 3 and 4, the back rest 44 of the front seat 42 is held in its raised rearward position by disposition of the locating pins 121 (Figure 6) in the openings 120 provided in the horizontal flange 114 of the angle member 110 of the bolster 107 and by disposition of the spring metal clips 122 in the recesses 123 in the lower transverse angle member 94 of the lower portion 88 of the back rest 45, the seat portion 44 being retained in its rearward position by  
20 engagement of the tongues 70 in the slots 71 in the front transverse angle member 57 of the frame of the seat portion 44.

When it is desired to move the front seat 42 into its sleeping position as shown in Figures 1 and 2, the front edge of the seat portion 44 of that seat is first elevated until the front transverse member 57 thereof is clear of the tongues 70. The seat portion 44 is then pulled forwardly as indicated by the arrow B in Figure 3, such forward movement of the seat portion 44 continuing until the rollers 75 reach the forward  
30 ends of the guide channels 65 and 66.

The upper portion 89 of the back rest 45 is then pulled forwardly and downwardly as indicated by the arrow C in Figure

3 to release the spring clip fasteners 119 (Figure 6) from the openings 118 in the frame of the bolster 107. The lower end of the lower portion 88 of the back rest 45 is then pulled forwardly and upwardly as indicated by the arrow D in Figure 5 to disengage the spring metal clips 122 from the recesses 123. The back rest 45 is then moved forwardly and downwardly into the position shown in Figures 1 and 2 so as to provide, jointly with the forwardly disposed seat portion 44, a mattress on which a person can sleep. The upper portion 89 of the back rest 45 is finally pressed downwardly so as to be supported by the spring clip fasteners 122 and by the panel 83. From Figure 1, it will be seen that the cushion members 145 and 147 provided in the doors 39 provide additional sleeping length.

When it is desired to return the front seat 42 into the driving position shown in Figures 3 and 4, the upper portion 89 of the back rest 45 is first pivoted forwardly against the action of the hinge springs 134 and the back rest 45 is then moved bodily upwardly until the pins 121 projecting from the upper transverse edge surface 91 of the lower portion 88 of that back rest 45 are received in the corresponding openings 120 in the undersurface 113 of the bolster 107. The lower part of the lower portion 88 of the back rest 45 is then pushed rearwardly so that the spring metal clips 122 are again received in the recesses 123 in the lower transverse edge surface 92 of that lower portion 88.

The upper portion 89 of the back rest 45 is next pushed rearwardly so that the spring clip fasteners 119 are again received in the openings 118 in the bolster 107. Finally, the seat portion 44 is pushed rearwardly and its front end elevated so that the tongues 70 are once again received in the slots 71 in the front transverse frame angle member 57 of that seat portion 44.

Referring now to the rear seat 43, it will be seen from Figure 8 that the construction of the seat portion 46 of that seat is similar to that of the seat portion 44 of the front seat 42 in that it includes a metal frame construction including a front transverse angle member 151, a rear transverse angle member 152 and cross members 153. The seat portion 46 also comprises springs 154 supported on the cross members 153, resilient foam padding 155 and a fabric covering 156. The seat portion 46 has a top surface 157 and front and rear transverse edge surfaces 158 and 159 respectively.

Since the longitudinal position of the rear seat of an automobile is not normally made adjustable, upstanding guide channels 160 and 161 including, at their forward ends, upstanding tongues 162 are mounted directly on the floor 41 of the automobile 36 rather than on longitudinally adjustable runners as was the case for the guide channels 65 and 66 of the front seat 42. Openings 163 are provided in the front transverse angle member 151 of the seat portion 46 for receiving the tongues 162 so as releasably to hold that seat portion 46 of the rear seat 43 in its rearward position as shown in Figures 3 and 8.

It will be noted from Figures 1, 8 and 14 that the side edges of the seat portion 46 of the rear seat 43 are inwardly offset as at 164 at their rearward ends so that the rear part of that seat portion 46 can be disposed between rear wheel covers 165.

The guide channels 160 and 161 provided for the seat portion 46 of the rear seat 43 are essentially identical with the channels 65 and 66 provided for the seat portion 44 of the front seat 42 and include upper and lower flanges 166 and 167 respectively which are interconnected by upstanding webs 168.

The upper flange 166 and the upstanding web 168 of each of the guide channels 160 and 161 are cut away at their forward ends to allow a respective one of the tongues 162 removably to be received in a corresponding one of the openings 163 in the front transverse angle member 151 of the seat portion 46. The upper flange 166 of each of the guide channels 160 and 161 is cut away as at 169 generally centrally thereof to permit complete removal of the seat portion 46 from the automobile 36 as was the case for the seat portion 44 of the front seat 42 and for a reason which will be explained subsequently herein.

The back rest 47 of the rear seat 43 is similar to the back rest 45 of the front seat 42 in that it includes a major lower portion generally indicated at 170 and a smaller upper portion generally indicated at 171 and which is hingedly mounted on the lower portion 170 for movement between the positions shown in Figures 2 and 3.

The back rest 47 has a transverse width essentially the same as that of the rear part of the seat portion 46 of that seat and its lower portion 170 has a metal frame construction including a lower transverse angle member 172 in turn including a horizontal flange 173. The front surface of the back rest 47 is indicated by the legend 174 while the top and bottom transverse edge surfaces are indicated by the legends 175 and 176 respectively.

The rear upper corner of the lower portion 170 of the back rest 47 is cut away diagonally to provide an obliquely disposed rearwardly and upwardly facing surface 177 bounded by upper and lower transverse frame angle members 178 and 179 respectively as will be readily understood by reference to Figure 3. Cross members 180 and 181 extend between the angle members 172, 179 and 178, 179 respectively, springs 182 being

supported on the cross members 180. The lower portion 170 of the back rest 47 also includes resilient foam padding 183.

The upper portion 171 of the back rest 47 comprises a metal frame construction and resilient foam padding 184. The front surface of the upper portion 171 is indicated by the legend 185 while the top transverse edge surface thereof is indicated by the legend 186. The rear lower corner of the upper portion 171 of the back rest 47 is cut away to provide an obliquely disposed rearwardly and downwardly facing surface 187 bounded by upper and lower transverse frame angle members 188 and 189 respectively. Upwardly of the obliquely disposed surface 187, the rear surface 190 of the upper portion 171 of the back rest 47 is generally parallel to the front surface 185 thereof and is bounded by the frame angle member 188 and by an upper transverse frame angle member 191. A fabric covering 192 which is usefully continuous through the front surfaces 174 and 185 of the lower and upper portions 170 and 171 respectively of the back rest 47 provides an unbroken appearance to the front surface of that back rest.

The upper portion 171 of the back rest 47 is hingedly mounted on the lower portion 170 thereof in much the same way as the upper portion 89 of the back rest 45 of the front seat 42 was mounted on the lower portion 88 of that back rest. The hinges 193 used for mounting the upper portion 171 of the back rest 47 on the lower portion 170 thereof are essentially identical to the hinge shown in Figure 7 and differ therefrom only in that the hinge leaves have slightly different configurations in view of the shapes of the opposed surfaces of the two portions of the back rest 47. It will be seen from Figure 9 that each such hinge 193 includes upper and lower hinge leaves 194 and 195 respectively, each of which is in turn formed with a straight inner section 196 and an obliquely disposed outer

section 197. Otherwise, the hinges 193 are identical to the hinges 126. The torsion springs of the hinges 193 act to urge the upper portion 171 of the back rest 47 to rotate clockwise relative to the lower portion 170 thereof when viewed as in Figures 2 and 3. The hinges 193 are secured to end frame members of the upper and lower portions 171 and 170 respectively of the back rest 47.

10 Rearwardly of the back rest 47 and between the rear wheel covers 165, a wall generally indicated at 201 divides the interior of the automobile 36 from its trunk. The wall 201 is formed with a forwardly projecting and triangular sectioned transverse extension generally indicated at 202 and having upwardly and downwardly facing oblique front surfaces 203 and 204 respectively. The wall 201 extends generally upwardly as at 205 from the top transverse edge of the surface 203 of the extension 202 and for a short distance downwardly as at 206 from the bottom transverse edge of the surface 204 of the extension 202. In its lower part 207, the wall 201 curves rearwardly and downwardly so as to accommodate the  
20 upper portion 171 of the back rest 47 when that back rest is moved into its lowered forward position as will be readily understood by reference to Figure 2.

Two forwardly and upwardly projecting tongues 212 are provided in transversely spaced apart positions on the obliquely disposed surface 203 of the extension 202 so as to be received in openings 213 (Figure 9) in the frame angle member 188 of the upper portion 171 of the back rest 47 near the transverse outer ends thereof.

30 A hollow transverse member 214 is mounted on the floor 41 between the rear wheel covers 165 and includes an upper web 215 formed with an upstanding transverse rib 216 which is removably received in a transversely extending recess 217



provided for this purpose in the lower transverse angle member 172 of the lower portion 170 of the back rest 47 when that back rest is disposed in its raised rearward position as shown in Figure 3. When the back rest 47 is disposed in its lowered forward position as shown in Figures 1 and 2, the upper portion 171 of that back rest 47 is supported on the transverse member 214.

As was the case for the front doors 39, cushion members 220 and 221 having upwardly facing top surfaces 222 and 223 respectively are provided in relatively large recesses 224 formed in each of the rear doors 40 of the automobile 36, such surfaces 222 and 223 forming transversely outward extensions of the top surface 157 of the seat portion 46 and of the front surface 174 of the lower portion 170 of the back rest 47 when those parts of the rear seat 43 are disposed in their extended forward positions as shown in Figures 1 and 2.

Since both the rear part of the seat portion 46 of the rear seat 43 and the back rest 47 thereof have a smaller transverse width than the front part of that seat portion 46, there would be an unfilled space 225 inwardly of the inner transverse edge of each of the cushion members 220 and 221 when the rear seat 43 is disposed in its forward sleeping position as shown in Figures 1 and 2. Arm rests generally indicated at 226 and 227 respectively are movably mounted in a manner yet to be explained in housings 228 and 229 respectively provided above the rear wheel covers 165 so that those arm rests can be moved into such spaces 225 so in turn to provide a continuous upwardly facing surface with the seat portion 46 and the back rest 47 as will be readily understood by reference to Figure 1.

The manner in which the arm rests 226 and 227 are mounted for movement between the lowered forward positions

shown in Figure 1 and the raised positions shown in Figure 8 as well as for pivotal retraction as indicated by the arrow E in Figure 8 will now be explained with particular reference to Figures 8 and 10 to 13.

Each of the arm rests 226 and 227 has a metal frame construction generally indicated at 230 and comprises springs 231, resilient foam padding 232 and a fabric cover 233. Since the arm rests 226 and 227 are mounted in essentially identical manners on respective ones of the wheel covers 165, the construction of only one such mounting, namely that of the arm rest 226, will be described in detail herein.

Near the rearward end of the arm rest 226 and internally thereof, there is provided an upstanding bracket 235 on which there is secured a discoid stud 236 having a segmental extension 237. An axial opening 238 extends through both the stud 236 and the bracket 235 to receive a shoulder bolt 239 which is retained in position by a nut 240. The rear end wall 241 and the base 242 of the arm rest 226 are slotted as at 243 to receive a bracket 244 which is also provided with a discoid stud 245 which is in turn formed with a segmental extension 246 from mating engagement with the aforementioned extension 237 on the stud 236 when the arm rest 226 is pivotally mounted on the bracket 244 by the bolt 239.

From Figures 10 and 13, it will be seen that the segmental extension 237 is formed with radially extending surfaces 248 and 249 for abutment with corresponding radially extending surfaces 251 and 252 formed on the extension 246. It will now be understood that abutment of the surface 248 of the extension 237 with the surface 251 of the extension 246 as actually shown in Figure 10 prevents further anti-clockwise rotation of the arm rest 226 when viewed as in Figure 10 beyond the position shown. Clockwise rotation of the arm

rest 226 about the bolt 239 from the position shown in Figure 10 is, however, possible until the surface 249 on the extension 237 engages the surface 252 on the extension 246, so as to allow the arm rest 226 to be retracted pivotally into the housing 228. Similarly, the arm rest 227 can be retracted into the housing 229.

Referring now in greater detail to Figures 10 to 12, it will be seen that the bracket 244 on which the arm rest 226 is pivotally mounted is itself movably mounted on a U-shaped guide track generally indicated at 254 and which is in turn mounted by a bracket 255 on a respective one of the rear wheel covers 165.

The guide track 254 includes upper and lower flanges 256 and 257 respectively which are interconnected by a web 258. At their edges opposite the web 258, the flanges 256 and 257 are formed with opposed inturned lips 259 and 260 respectively which together define a longitudinal slot 261. Rollers 262 and 263 shown in phantom outline in Figure 10 are rotatably mounted on shafts 264 secured to the bracket 244 and extending through the slot 261 so that the rollers 262 and 263 are disposed for rolling movement in the guide track 254 as will readily be understood by reference to Figure 11. In this way, the bracket 244 is mounted for translational movement along the guide track 254 for movement in turn of the arm rest 226 between the position shown in solid lines in Figure 10 and the position shown fragmentarily in the same figure and in phantom outline at 226'. When the arm rest is disposed in the position indicated at 226' in Figure 10, that arm rest is then disposed as shown in Figure 1 in a respective one of the spaces 225 inwardly of the rear cushion members 220 and 221.

When the rear seat 43 of the automobile 36 is in its

rearward retracted position as shown in Figures 3 and 8, the arm rest mounting bracket 244 is locked in its uppermost position in a manner yet to be explained so that the arm rest 226 is disposed generally horizontally above the level of the seat portion 46 and as actually shown for the arm rest 227 in Figure 8. When a passenger wishes to enter or leave the automobile 36 through one of the rear doors 40, the respective one of the arm rests 226 and 227 can be pivotally retracted into a respective one of the housings 228 and 229 as indicated by the arrow E in Figure 8.

Referring now in greater detail to Figures 10 and 12, there is indicated therein generally at 266 a spring-biassed locking pin by means of which the arm rest 226 can be secured, as desired, in its raised or in its lowered positions. The locking pin 266 includes a shaft 267 and a handle 268, the former extending through a U-shaped bracket 269 secured to the side of the aforementioned bracket 244 by rivets 270. A helical compression spring 271 is coaxially disposed about the shaft 267 of the pin 266 between flanges 272 and 273 of the bracket 269. A cotter pin 274 extends through shaft 267 to engage the lower end of the spring 271 which consequently acts to urge the shaft 267 downwardly into a selected one of two openings 275 formed in the upper flange 256 of the guide track 254. With the shaft 267 received in the upper one of said openings 275, the arm rest 226 is disposed in its raised position as shown in solid lines in Figure 10 while with the shaft 267 received in the lower one of the openings 275, that arm rest 226 is disposed in its lowered position as shown in Figure 1.

The manner in which the rear seat 43 is moved between the forward extended position thereof as shown in Figures 1 and 2 and its rearward retracted position as shown in Figures

3 and 8 will now be summarized. Assuming that the rear seat 43 is in its rearward retracted position and that it is desired to move it into its forward extended position for sleeping purposes, the front edge of the seat portion 46 of that seat is first raised to remove the tongues 162 from the openings 163 in the front transverse angle member 151 of that seat portion. The seat portion 46 can then be pulled forwardly as indicated by the arrow B in Figure 3 until rollers 198 provided in the guide channels 160 and 161 abut the upstanding tongues 162 at the forward ends of those guide channels 160 and 161.

The lower portion 170 of the back rest 47 of the rear seat 43 is next lifted slightly and pulled forwardly to move its bottom transverse edge surface 176 off the hollow transverse member 214. The upper portion 171 of the rear seat back rest 47 is then pivoted counter-clockwise (Figure 3) so that the tongues 212 (Figure 9) are no longer disposed within the openings 213 in the transverse frame member 188. The back rest 47 can then be lowered into the position shown in Figures 1 and 2 with the upper portion 171 thereof being supported on the hollow transverse member 214 as actually shown in Figure 2.

With the back rest 47 lowered into the position shown in Figures 1 and 2, the locking pins 266 for the rear arm rests 226 and 227 are accessible and can be released against the action of their springs 271 so that those arm rests can then be lowered along the guide tracks 254. The arm rests themselves are then pivoted forwardly and downwardly into the positions shown in Figure 1. In this way there is provided a continuous sleeping surface throughout the full width of the automobile.

When it is desired to move the rear seat 43 into its

retracted position, the arm rests 226 and 227 are first moved to their raised positions in the manner already described, the back rest 47 is then lifted into its rearward raised position in the manner already explained and the seat portion 46 is pushed rearwardly and lifted at its front edge to allow the upstanding tongues 162 to enter the openings 163 in the front transverse member 151 of the seat portion 46 so as to hold that seat portion in its rearward position.

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In accordance with another useful feature of this invention, the seat portions and back rests of the front and rear seats 42 and 43 respectively can be removed from the automobile and interconnected in serial transverse edge juxtaposition with each other to provide a camping mattress as indicated generally at 285 in Figures 14 and 15. It will be seen from those figures that the several seat parts are disposed so that the smaller upper portions 89 and 171 of the back rests 45 and 47 respectively of the front and rear seats 42 and 43 respectively are disposed terminally of the mattress 285.

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Two retractable fasteners 286 are provided on the back rest 45 of the front seat 42 and on each of the seat portions 44 and 46 for the purpose of interconnecting the various parts to form the mattress 285. For example, two retractable fasteners 286 are pivotally mounted on the back rest 45 of the front seat 42 for connecting the bottom transverse edge surface 92 of the lower portion 88 of that back rest in transverse edge juxtaposition with the rear transverse edge surface 62 of the seat portion 44 of the front seat 42. Similarly, two retractable fasteners 286 are pivotally mounted on the seat portion 44 of the front seat 42 for securing that seat portion with its front transverse edge surface 61 in transverse edge juxtaposition with the front

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[A]

transverse edge surface 158 of the seat portion 46 of the rear seat 43. The seat portion 46 of the rear seat 43 is itself provided with two retractable fasteners 286 for holding the rear transverse edge surface 159 of that seat portion in juxtaposition with the bottom transverse edge surface 176 of the lower portion 170 of the rear seat back rest 47.

Each of the fasteners 286 is mounted on a respective one of the seat parts for toggle action movement between a retracted position in which it is essentially disposed within the respective seat part and an extended position in which it projects beyond a respective transverse edge of the seat part for releasable engagement with the lower transverse frame member of an adjacent seat part.

Since all the fasteners 286 are essentially identical in their construction and manner of operation, only one such fastener will be described in detail herein with reference to Figures 16 to 18, which figures show one of the fasteners 286 used for interconnecting the front transverse edge surface 61 of the seat portion 44 of the front seat 42 and the front transverse edge surface 158 of the seat portion 46 of the rear seat 43.

From Figures 16 to 18, it will be seen that the fastener 286 shown therein includes a pivotally mounted spring metal arm generally indicated at 287 and which terminates at its free end in a hook-like portion 288 which engages the horizontal flange 289 of the front transverse frame angle member 151 of the seat portion 46 of the rear seat 43. At its opposite end, the arm 287 is formed with a pivot sleeve 290 by means of which the arm 287 is mounted for movement as indicated by the arrows F in Figure 18. For this purpose, a pivot shaft 291 is supported in a fixed pivot sleeve 292 which is integrally formed with a mounting arm generally indicated

at 293 which is in turn secured by rivets 294 to the horizontal flange 72 of the front transverse frame angle member 57 of the seat portion 44 of the front seat 42.

The pivot shaft 291 is formed at its rearward end with an enlarged head 296 and extends forwardly through the pivot sleeves 292 and 290 so as to project forwardly therefrom, a washer 297 being disposed around the shaft 291 forwardly of the sleeve 290 and the pivot assembly being held in its assembled configuration by a retaining pin 298.

10 A tongue 301 is integrally formed with the arm 287 and projects transversely therefrom. One end of a helical tension spring 302 is anchored to the tongue 301 and the opposite end of the spring 302 is anchored to an arm 303 disposed above the pivot sleeve 290 and carried by an upstanding bracket 304 integrally formed with the aforementioned mounting arm 293.

The spring 302 provides a toggle action serving to hold the arm 287 in either its extended position as shown in Figures 16 and 17 or its retracted position as shown in phantom outline in Figure 18.

20 When it is desired to remove the seats 42 and 43 from the automobile 36 for their interconnection to form the camping mattress 285, the front edge of the seat portion 44 of the front seat 42 is raised slightly so that the tongues 70 are removed from the openings 71 in the front transverse angle member 57 of that seat portion 44. The seat portion 44 is then pulled forwardly as indicated by the arrow B in Figure 3 until the rollers 75 are disposed directly below the cut away portions 76 of the upper flanges 67 of the guide channels 65 and 66. At that time, the seat portion 44 can be lifted clear of the guide channels 65 and 66 and removed from the automobile.



The retractable fasteners 286 at the front transverse edge 61 of the seat portion 44 are then pivoted into their extended positions as shown in Figures 16 to 18 and that seat portion is then placed in a desired position on the ground. The seat portion 46 of the rear seat 43 is then removed from the automobile 36 in exactly the same manner and the fasteners 286 at the rear transverse edge surface 159 thereof are similarly moved into their extended positions. The seat portion 46 is then placed against the seat portion 44 of the front seat 42 so that the hook-like end portions 288 of the fasteners 286 on the seat portion 44 engage the front transverse angle member 151 of the seat portion 46 as actually shown in Figures 15 to 18.

The back rests 45 and 47 of the front and rear seats 42 and 43 respectively are next released from their supporting structures in the automobile 36 in the manner already described herein and connected to the seat portions 44 and 46 using respective ones of the fasteners 286 in the same way that those two seat portions were connected together. In this way, the camping mattress 285 is formed.

Reference will now be made to the two-door automobile generally indicated at 310 in Figure 19 of the accompanying drawings. Since the automobile 310 has many features in common with the four-door automobile 36 already described herein, corresponding components of the two vehicles will be indicated, as required, by the same legends to avoid undue duplication of the description herein.

The automobile 310 includes side walls 311 in which front doors 312 are hingedly mounted in a conventional manner, a front seat generally indicated at 313 and a rear seat generally indicated at 314.

The front seat 313 has a conventional construction and

includes a seat portion 315 and back rests 316 and 317, each of which extends half-way across the seat 313. The back rests 316 and 317 are pivotally mounted for forward tilting movement as actually shown for the back rest 317 on the driver's side of the automobile 310 in Figure 19 to allow passenger access to the rear seat 314 from the doors 312 of the automobile 310. Since the construction of the front seat 313 is conventional, it will not be described further herein.

10 The rear seat 314 includes a seat portion generally indicated at 320 and having a top surface 321, as well as a two-part back rest generally indicated at 322, the lower major portion of which is generally indicated by the legend 323 and which has a front surface 324. Both the seat portion 320 and the back rest 322 have a length essentially equal to the transverse separation between the rear wheel covers 325.

20 The seat portion 320 is mounted on guide means (not shown) for movement as indicated by the arrow G between a rearward retracted position and the forward extended position shown in Figure 19, the mounting means provided for this purpose being identical to those already described herein for the seat portion 46 of the rear seat 43 of the automobile 36.

As was the case for the back rest 47 of the rear seat 43 of the automobile 36, the back rest 322 of the rear seat 314 of the automobile 310 has a two-part construction including an upper portion 326 which is hingedly mounted on the lower portion 323 thereof in the same way that the upper portion 171 of the back rest 47 was mounted on the lower portion 170 thereof.

30 Mounting means identical to those described for the back rest 47 are provided for retaining the back rest 322 in its rearward raised position and for allowing it to be released from that position and moved into the forward extended posi-

tion actually shown in Figure 19, in which position the front surface 324 of the lower portion 323 of the back rest 322 forms a generally horizontal extension of the top surface 321 of the seat portion 320.

10 The automobile 310 differs from the automobile 36 in that cushion members 330 and 331 which are provided in relatively large recesses 332 formed in the side walls 311 extend inwardly beyond the inner surfaces of those walls so as to extend to the side edges of the seat portion 321 and to the side edges of the lower portion 323 of the back rest 322 when the rear seat 314 is moved into its forward extended position as shown in Figure 19. Such cushion members 330 and 331 can, therefore, be used as extra seats, for example, for children, even when the seat 314 is disposed in its rearward retracted position.

It is also to be noted that the automobile 310 is provided with relatively shallow rear side windows 338 to permit larger recesses 332 to be provided in its side walls 311.

20 The automobile 310 also comprises pivotally mounted arm rests 339 and 340 which can be moved between the retracted position shown for the arm rest 340 and the extended position shown for the arm rest 339 and as indicated by the arrow H. Since the arm rests are not used to fill spaces between the back rest portion 323 and the cushion members 330 and 331, those arm rests 339 and 340 are not, however, mounted for translational movement as was the case for the arm rests 226 and 227 in the automobile 36.

30 The manner in which the rear seat 314 is moved between its retracted and extended positions will now be understood by comparison of Figure 19, on the one hand, and Figures 1, 2, 3 and 8, on the other hand.

Reference will now be made to Figures 20 to 22 which

show the application in the construction of an automobile in accordance with the present invention of one embodiment of the invention described in my aforementioned Patent Application Serial No. 089,431.

10 In accordance with this feature of the present invention as shown in Figures 20 to 22, each of the doors 351 provided at the transverse ends of one of the seats 349 of an automobile 350 is provided with a movably mounted arm rest generally indicated at 352 and having a top surface generally indicated at 353, the doors 351 being hingedly mounted in the automobile 350 in a conventional manner.

20 The seat 349 includes a back rest generally indicated at 354 and a seat portion generally indicated at 355 and having a top surface 356. The back rest 354 and the seat portion 355 are mounted for movement between rearward retracted positions as shown in Figure 22 and forward extended positions in which the front surface of at least a portion of the back rest 354 forms an essentially horizontal extension of the top surface 356 of the seat portion 355. For this purpose, the seat portion 355 and the back rest 354 can be mounted in the manner already described herein with reference to the preceding figures of the accompanying drawings.

The door 351 is formed from a continuous outer metal wall or panel 360 and transversely inwardly spaced therefrom an inner metal wall or panel 361. The inner wall 361 is generally vertical while the outer wall 360 is generally arcuate in vertical cross section extending transversely inwardly from its base to its top edge.

30 In its upper portion, the door 351 is provided with a window 362 which can be raised or lowered between the positions shown in Figures 20 and 21, as required, by means of a window crank handle (not shown). The window 362 is mounted

so as to slope inwardly and upwardly with respect to the door 351. With such disposition, the window 362 is positioned in close proximity to the outer wall 360 of the door 351 when that window is lowered into its open position.

10 The arm rest 352 is adjustably mounted on the door 351 for movement between a raised position and either of two lowered positions. The arm rest 352 is shown in Figure 22 as being disposed in its raised position in which it actually functions as an arm rest while, in Figure 21, the arm rest 352 is shown as being disposed in the lower one of its two lowered positions. In this lowermost position, the top surface 353 of the arm rest 352 is usefully disposed parallel to but slightly lower than the top surface 356 of the seat portion 355 of the seat 349 when that seat portion is disposed in its forward extended position. In this way, a person sleeping or resting on the seat 349 can rest his feet on the arm rest 352 as shown schematically in Figure 21. Since the seat 349 is likely to be more compressed by the weight of the person resting thereon that is the arm rest 352, such  
20 slight difference in the positions of the top surfaces 353 and 356 is often desirable.

In Figure 20, the arm rest 352 is shown as being disposed in the higher one of its two lowered positions and, when the arm rest 352 is disposed in this intermediate position, the top surface 353 thereof usefully extends upwardly and outwardly generally from the top surface 356 of the seat portion 355 so as to provide an inclined head-supporting pillow as will readily be understood by reference to Figure 20.

30 The manner in which the arm rest 352 is mounted on the door 351 for movement between the various positions already identified and the means provided for retaining the arm rest 352 in each of these several positions will next be briefly

described. Before so proceeding, however, it should perhaps be noted that, with the door 351 closed as shown, for example, in Figure 22, there is a small space or gap, for example of about one to two inches, between the inner panel 361 of the door 351 and the adjacent transverse side edge of the seat 349. With the arm rest 352 disposed in either of its two lowered positions, the means provided for mounting that arm rest 352 on the door 351 are adapted to cause the arm rest to project inwardly beyond the inner wall 361 of the door 351 so as substantially to bridge that gap.

Referring now in greater detail to the structure of the door 351, it will be seen that a relatively large opening generally indicated at 366 is provided in the inner wall or panel 361 and that a lower web or panel 367 and spaced apart, front and rear side webs or panels 368 extend transversely outwardly from the inner wall 361 to an intermediate panel 369, an upper portion 370 of which extends inwardly and upwardly to define with the outer wall 360 of the door 351 an obliquely disposed window-receiving compartment generally indicated at 371. The intermediate panel 369 is disposed in close proximity to the outer wall 360 of the door 351 so as to provide a relatively large volume recess generally indicated at 372 and in which the arm rest 352 is at least partially mounted for vertical movement between its various positions already identified.

On each of its two ends, the arm rest 352 is provided with two transversely spaced apart and terminally extending guide pins (not shown). The outer guide pin at each end of the arm rest 352 is received in an upwardly extending slot-like opening 374 provided for this purpose in the respective one of the side panels 368.

In proximity to its lower end, each of the openings

374 is formed with upper and lower, outwardly extending and downwardly sloping detent slots 375 and 376 respectively. Corresponding upper and lower detent slots 377 and 378 are provided in the inner wall 361 and in the inner edges of each of the side panels 368 for receiving respective ones of the inner guide pins on the ends of the arm rest 352. The detent slots 377 and 378 extend outwardly from the inner edges of respective ones of the side panels 368 and the slots 376 and 378 downwardly terminate at essentially the same level so that, when the two guide pins on each end of the arm rest 352 are disposed in those particular slots, that arm rest 352 is positioned in its lowermost level position as shown in Figure 21. Each of the slots 375 terminates downwardly somewhat above the bottom of the opposite slot 377 so as to provide the desired slope for the arm rest 352 when that arm rest is disposed in its intermediate position as shown in Figure 20. Upwardly of the detent slot 375, each of the slot-like openings 374 curves inwardly as indicated at 379 and is provided at its upper end with downwardly and outwardly sloping detent slots 381 and 382, which are vertically spaced apart a small distance to permit some adjustment of the position of the arm rest 352 when it is actually being used as such as shown in Figure 22.

By curving each of the slot-like openings 374 inwardly as at 379, the arm rest 352 is itself caused to be shifted inwardly as it is raised to the position shown in Figure 22. In this way, adequate arm-supporting width is provided inwardly of the inner wall or panel 361 of the door 351. By curving each of the slot-like openings 374 inwardly at 379 as described, sufficient space is available between the outer and intermediate panels 360 and 369 respectively of the door 351 to allow for the provision of the aforementioned window-

receiving compartment 371 and so to allow movement of the window 362 between its open and closed positions.

10 Since the arm rest 352 might well in practice be used as a hand grip for pulling the door 351 into its closed position, that arm rest 352 is adapted to be locked or clamped in its raised position. Latch or locking means generally indicated at 384 are provided for releasably engaging the inner pins on respective ends of the arm rest 352 when that arm rest is disposed in its raised position as shown in Figure 22. The structure of the latch or locking means 384 will not, however, be described in detail herein, one suitable construction for such a locking means being described in detail in my aforementioned patent application. It should perhaps, however, be explained at this juncture that two such latch means 384 will be provided on the door 351 for clamping engagement with the inner pins provided at the two ends of the arm rest 352. The two latch means 384 provided on the door 351 will be identical except that one will, of course, be a mirror image of the other.

20 The arm rest 352 is usefully provided with an arm stop member generally indicated at 390 and which is mounted on the arm rest 352 so that it can be pivoted between a retractable position in which it is disposed generally within that arm rest as shown in Figures 20 and 21 and an extended position in which it extends upwardly from the top surface 353 of that arm rest outwardly of the inner edge of that surface so as to provide a vertical surface against which an occupant such as the driver of the automobile may rest his forearm when the arm rest is disposed in its uppermost position as actually shown in Figure 22. Co-operating locking means generally indicated at 391 are provided on the arm stop member 390 and on the side webs 368 of the recess 372 for releasably

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holding the arm stop member 390 in its extended or raised portion. One construction for such an arm stop member 390 is described in greater detail in my aforementioned patent application.

Referring now to Figures 23 and 24, there is shown therein the application to the construction of an automobile of the invention described in my aforementioned Patent Application Serial No. 122,289.

10 The automobile generally indicated at 401 in Figures 23 and 24 has a four-door structure including transversely aligned front doors 402. Disposed within the automobile 401, there is provided a front seat generally indicated at 403 and including a seat portion 404 and a back rest 405. The seat 403 is mounted in the automobile 401 for movement between a rearward retracted position as shown and a forward extended position in which at least a portion of the back rest 405 forms an essentially horizontal extension at the seat portion 404 in exactly the same manner as was the case for the automobile 36 hereinbefore specifically described with  
20 reference to Figures 1 to 18.

The doors 402 of the automobile 401 are hingedly mounted at their front edges in a conventional manner by hinges (not shown). Since the two front doors 402 are constructed in identical manners except of course that one is effectively a mirror image of the other, the structure of only one such door, namely that of the door 402 on the driver's side of the automobile 401 will be described in detail herein.

30 Hingedly mounted within each door 402, there is a housing which is generally indicated at 407 and which is defined by a top edge 408, a bottom edge 409 and front and rear side edges (not shown). The housing 407 is hingedly mounted in the door 402 by hinges generally indicated at 410

and provided along the top edge 408 of the housing 407 so that the latter can be moved between an inner retracted position as illustrated in Figure 23 and an outer extended position thereof as illustrated in Figure 24. The structure of the hinges 410 will not be described further herein.

10 The door 402 comprises an outer frame 411 formed from transversely spaced apart inner and outer panels or walls 412 and 413 respectively and in which frame 411 the housing 407 is hingedly mounted for movement between its extended and retracted positions.

20 The door 402 is provided on its rear edge surface with a latching and locking mechanism (not shown) of a conventional type and which engages a co-operating fixed latch plate (not shown) on the automobile body structure. An outside door latch-actuating button (not shown) is mounted on the outer panel 412 of the door 402 rearwardly of the housing 407 while an inside door latch-actuating handle (not shown) is suitably mounted on the inner panel 411 of the door 402 forwardly of the front side edge of the housing 407. Suitable linkages (not shown) extend within the door 402 between such button, such handle and the latching and locking mechanism so that the door 402 can be opened from the inside or outside of the automobile 401.

30 The housing 407 comprises transversely spaced apart inner and outer panels 416 and 417 respectively, the outer panel 417 being essentially continuous with the outer panel 413 of the frame 411 of the door when the housing 407 is disposed in its retracted position. In its upper part, the housing 407 is formed with corresponding openings in its inner and outer panels 416 and 417 respectively to provide a window frame generally indicated at 418 and in which a main window 419 and a deflector window (not shown) are mounted.

Below the window frame 418, the housing 407 is provided with an inwardly open recess 420 defined by front and rear generally vertical webs 421, top and bottom webs 422 and 423 respectively and an intermediate panel generally indicated at 424 and which is itself spaced apart inwardly from the outer panel 417 of the housing 407 to define therewith an obliquely disposed window-receiving compartment generally indicated at 425 and having a relatively narrow transverse width.

10 It will be seen that the outer panel 417, the intermediate panel 424 and the top web 422 of the housing 407 are dimensioned to allow the main window 419 to be moved between its raised closed position shown in Figure 24 and its lowered open position shown in Figure 23. A window-positioning handle (not shown) is mounted on the inner panel 416 of the housing 407 and suitable linkages (not shown) extend from that handle to the window 419.

20 Compressible seals are provided around the housing 407 to prevent the ingress of rain through the space between the housing 407 and the frame 411. For the purpose of holding the housing 407 in either of its retracted or extended positions, an appropriate latching mechanism schematically indicated at 430 is mounted on the housing 407 for engagement with a co-operating striker plate mounted on the frame 411 below the housing 407. By means of such a latching mechanism, the housing 407 can be locked in its retracted position (Figure 23) and released from that position, when desired, and then moved outwardly into its extended position (Figure 24) in which position it can also be releasably locked by the aforesaid latching mechanism 430.

30 On the top surface of the aforementioned bottom web 423 defining the recess 420 in the housing 407, there is provided a permanently fixed resilient cushion or padding 431

in turn having a top surface 432 which is disposed at approximately the same level as the top surface of the seat portion 404 of the front seat 403 when that seat is disposed in its forward extended position and when the housing 407 is moved outwardly into its extended position as shown in Figure 24.

10 A resiliently padded cushion member or arm rest generally indicated at 433 and having a top surface 434 is removably mounted within the recess 420 in the housing 407 as shown in Figure 23, in which position it functions as an arm rest for a person sitting on the seat 402. By removing the arm rest 433 from the recess 420, that member can then be disposed between the housing 407 and the seat 403 with its top surface 434 then being generally coplanar with the top surface 432 of the padding 431 in the bottom of the housing 407 as well as with the top surface of the seat portion 404 of the front seat 403 when that seat 403 is moved into its forward extended position.

20 At each of its ends, the arm rest 433 is provided with two longitudinally extending and transversely spaced apart pins (not shown) which are removably received in corresponding detent slots 436 in the front and rear webs 421 defining the recess 420 in the housing 407 so as to support the arm rest 433 in the position shown in Figure 23. Generally horizontal slots 438 are formed in the webs 421 to allow removal of the arm rest 433 from the position shown in Figure 23 when that arm rest is lifted to move the pins at each of its ends out of respective ones of the detent slots 436. The arm rest 433 can then be moved transversely inwardly.

30 It will now be understood that, by providing hinged housings, such as the housing 407 shown in Figures 23 and 24, in the side walls or doors of an automobile, it is possible to provide even greater sleeping width for a person

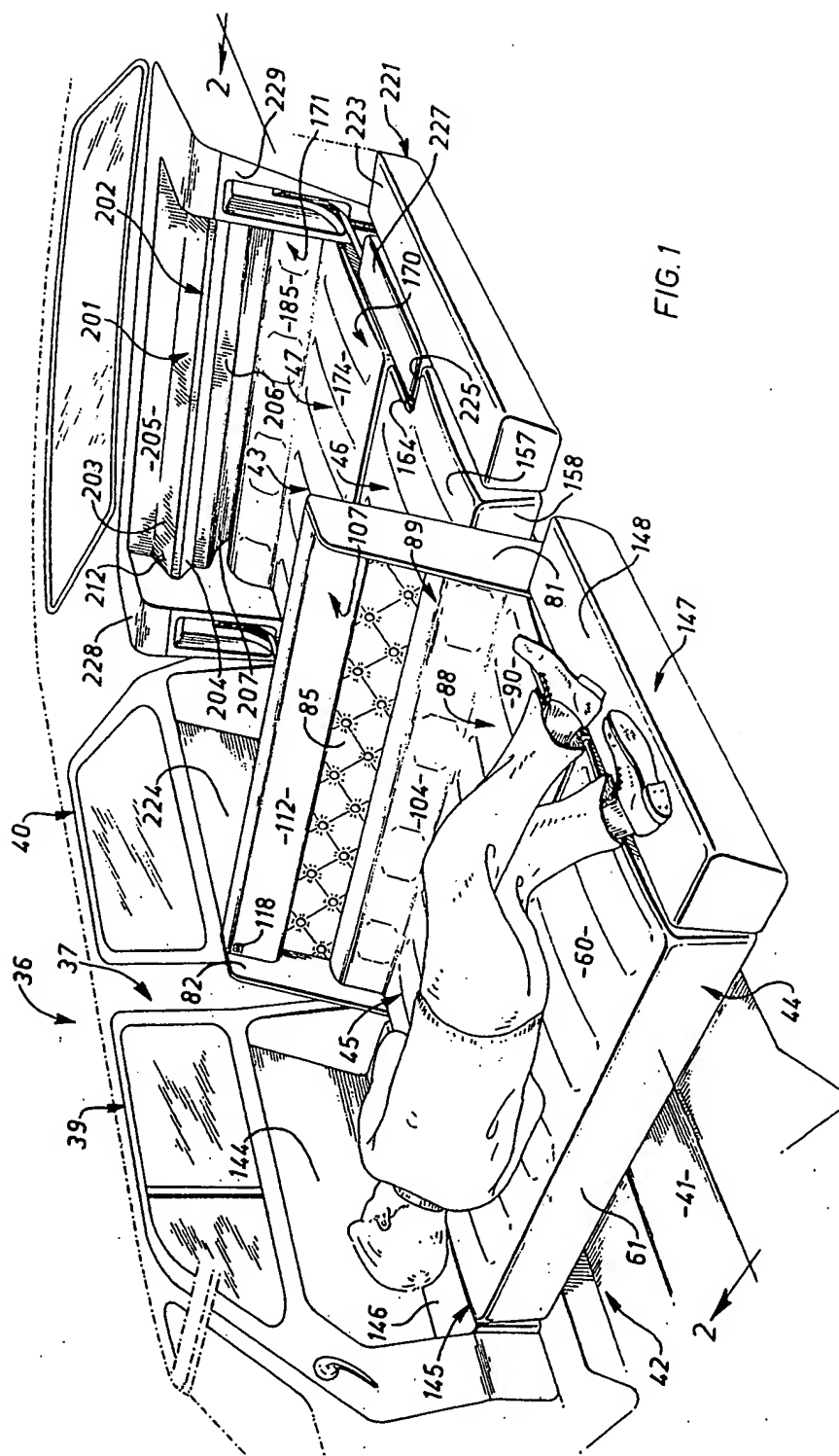
lying on a seat of such an automobile when that seat has been moved into its forward extended position.

Although the invention has been described with particular reference to the automobile body structures shown in the accompanying drawings, it should be understood that the invention is equally applicable to automobile body structures differing in many ways from the illustrated structures.

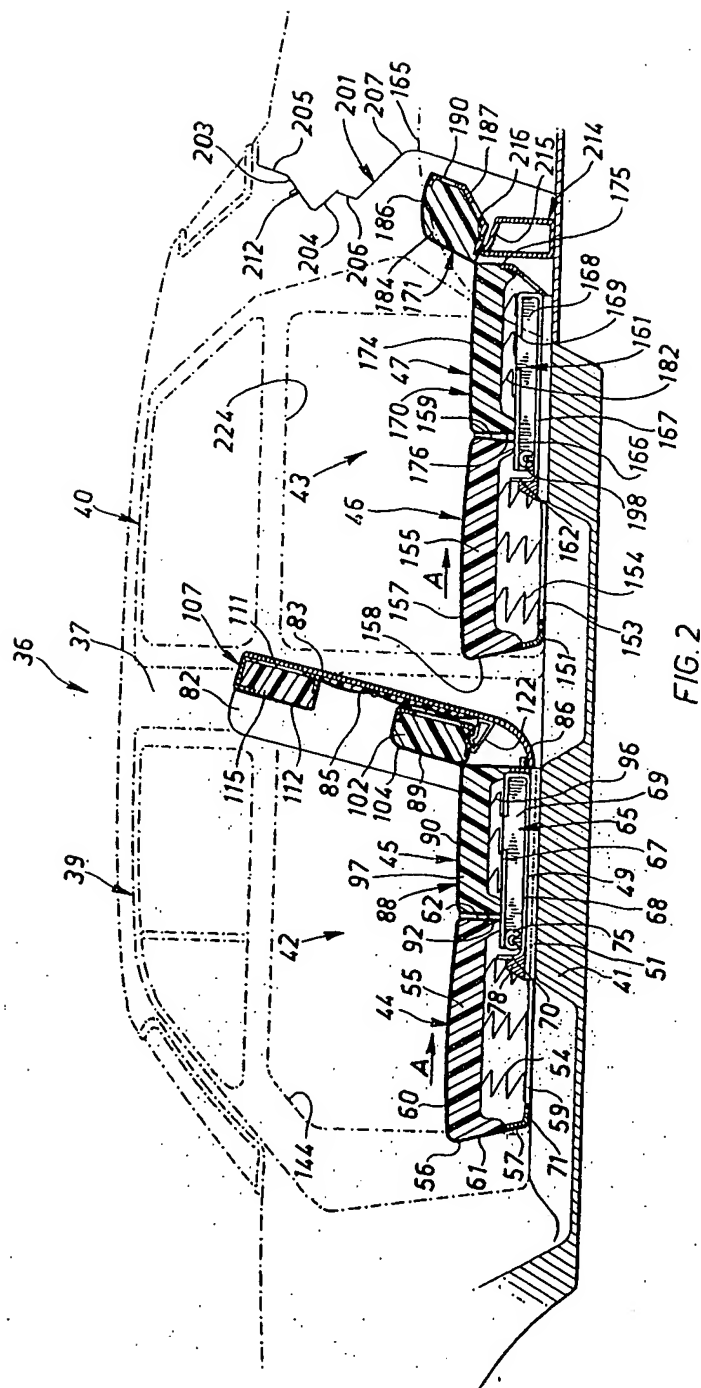
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J. Noel Wallin



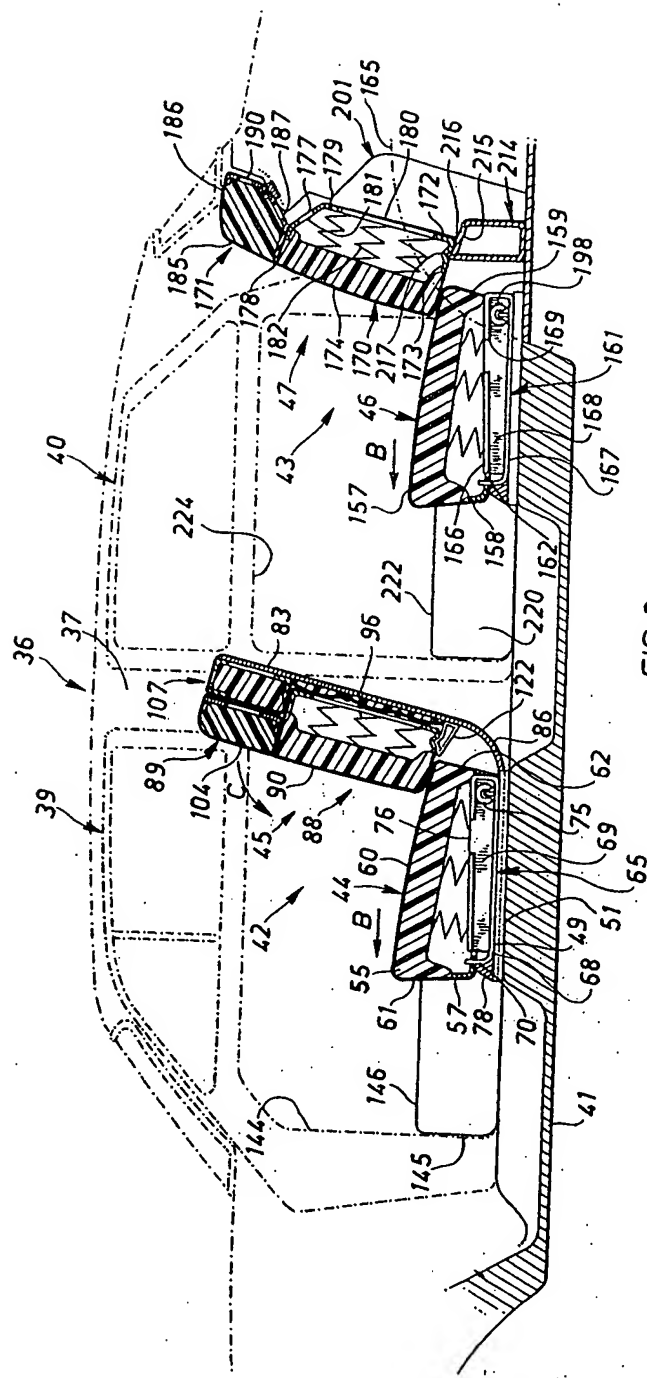
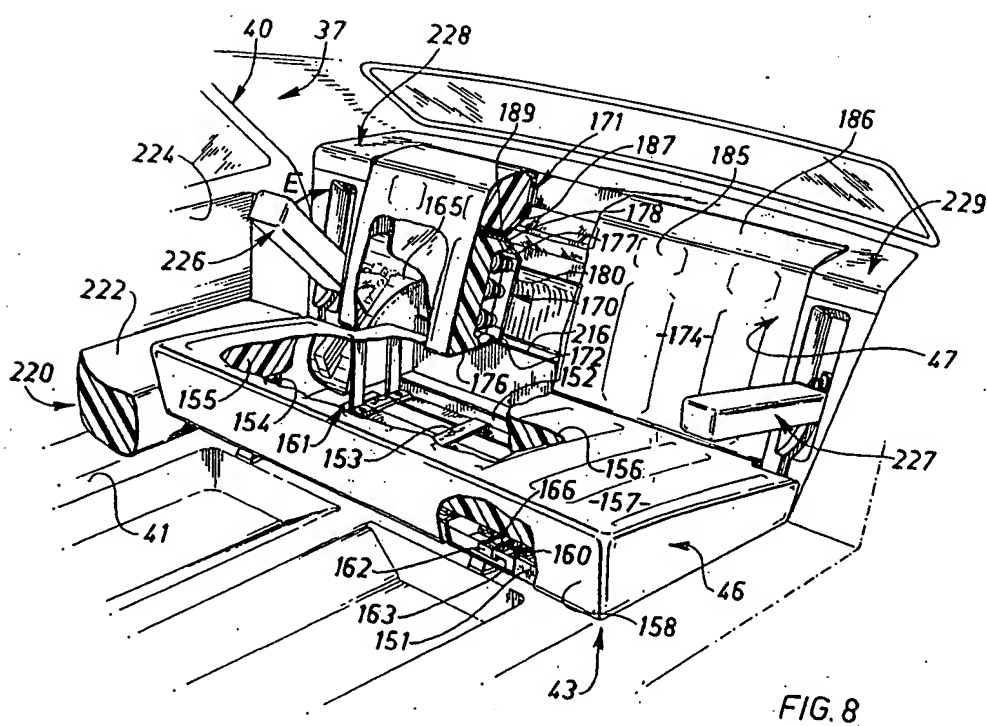
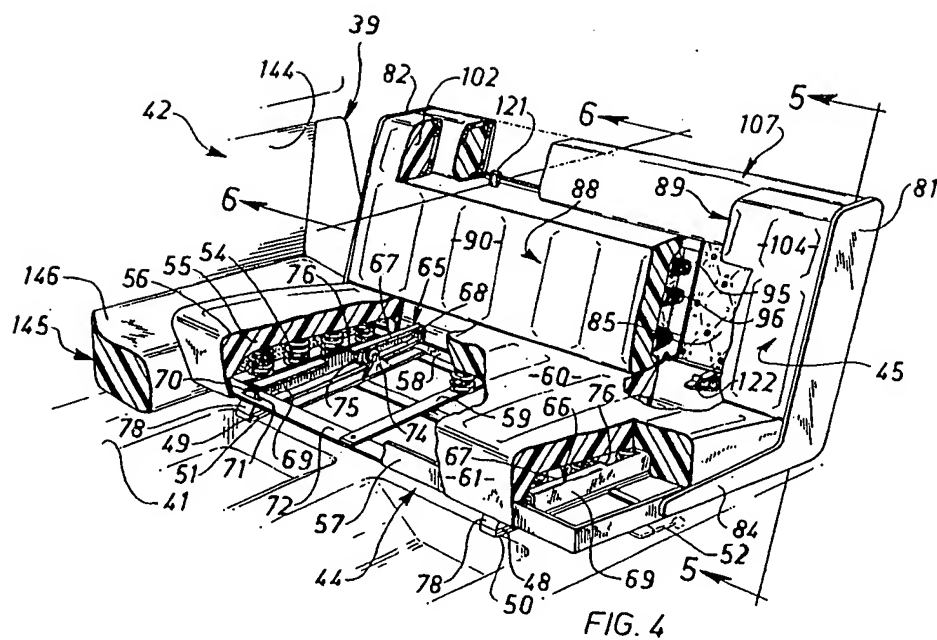


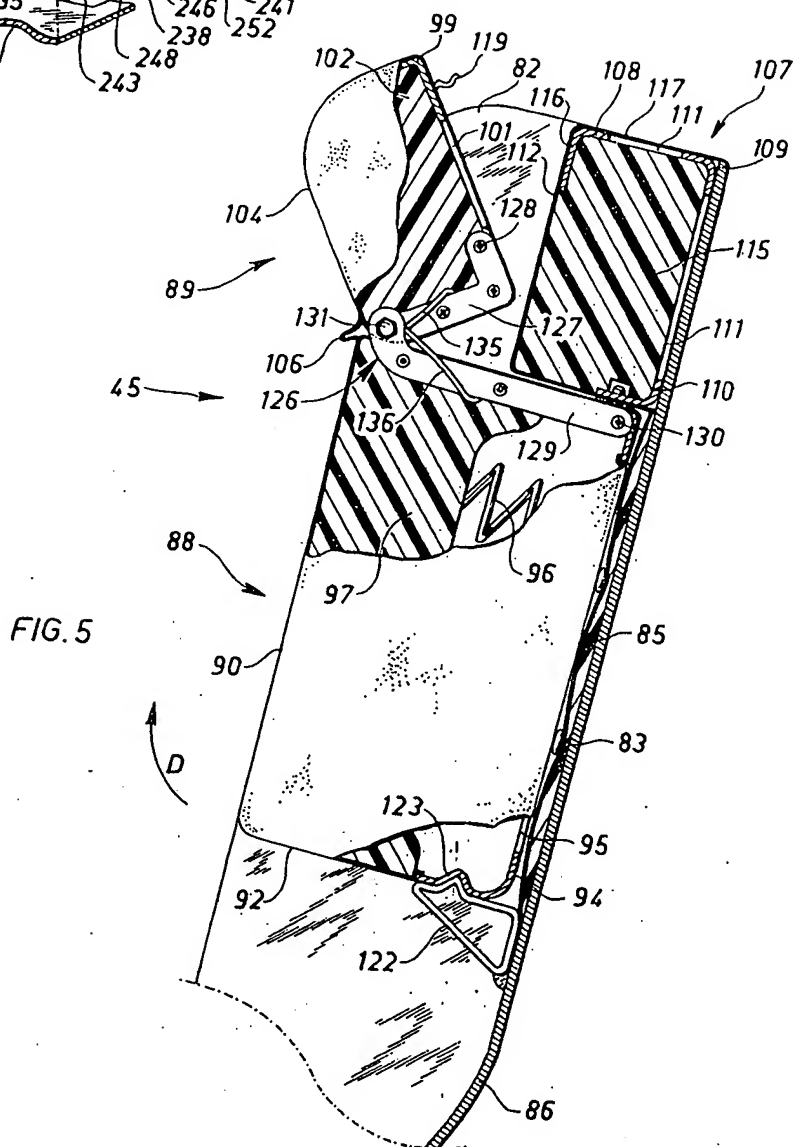
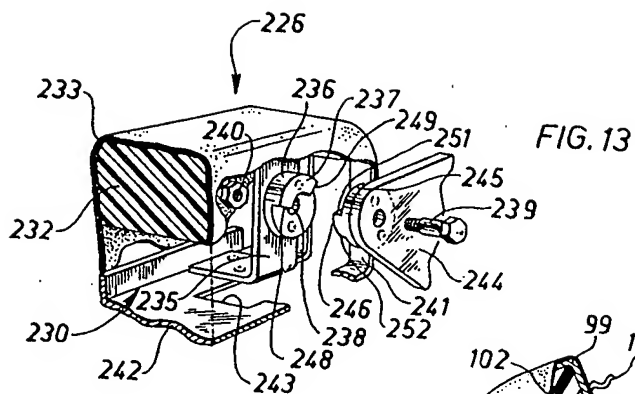
FIG. 3

*J. Karl W. H. M.*

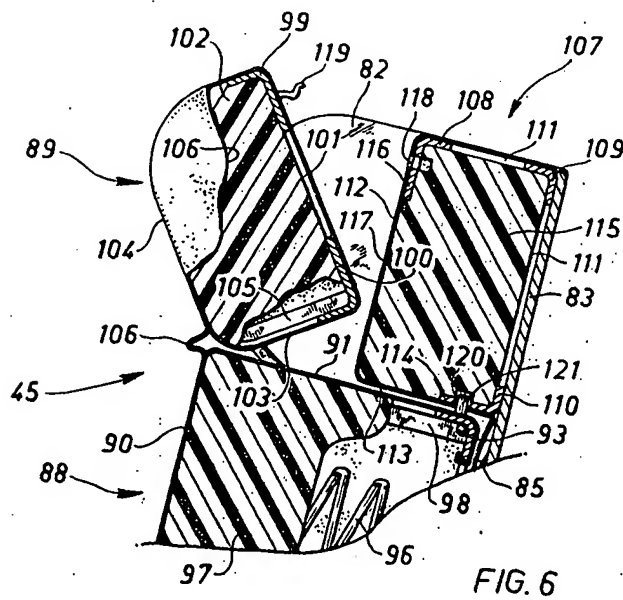
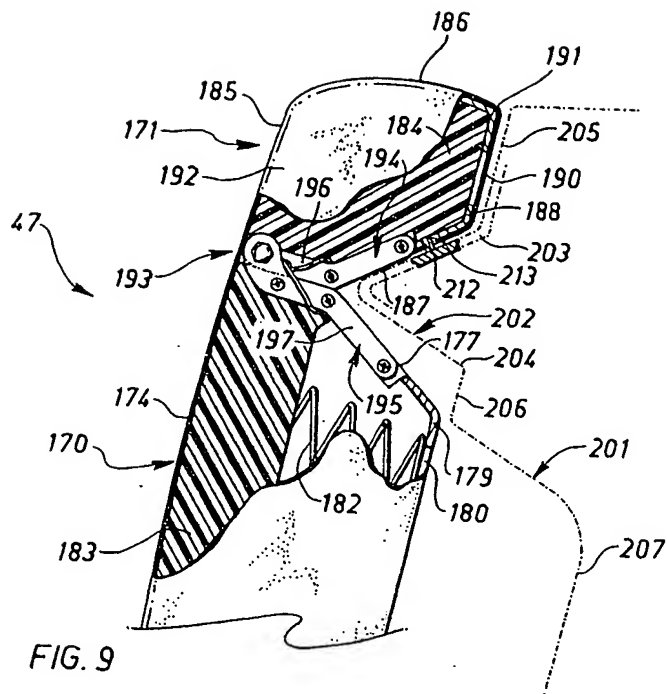




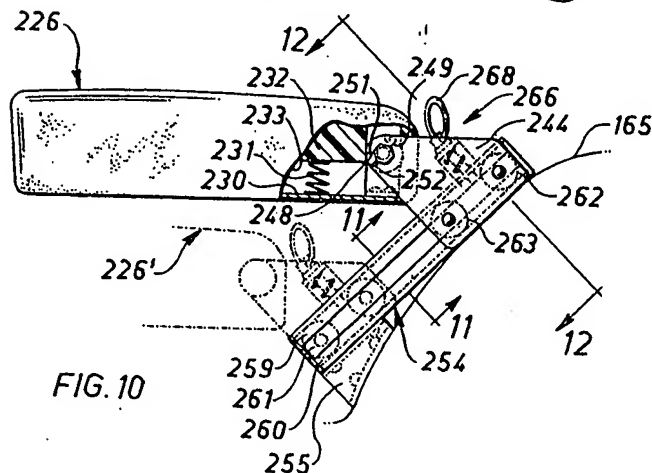
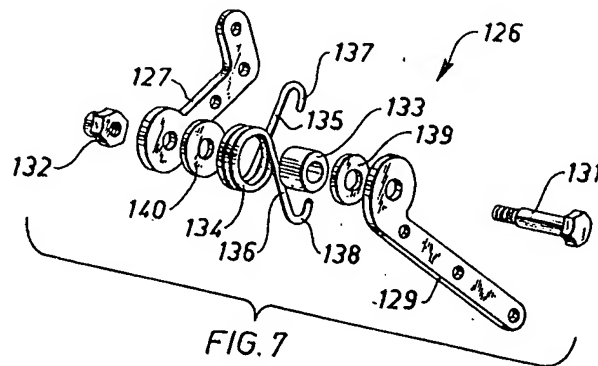
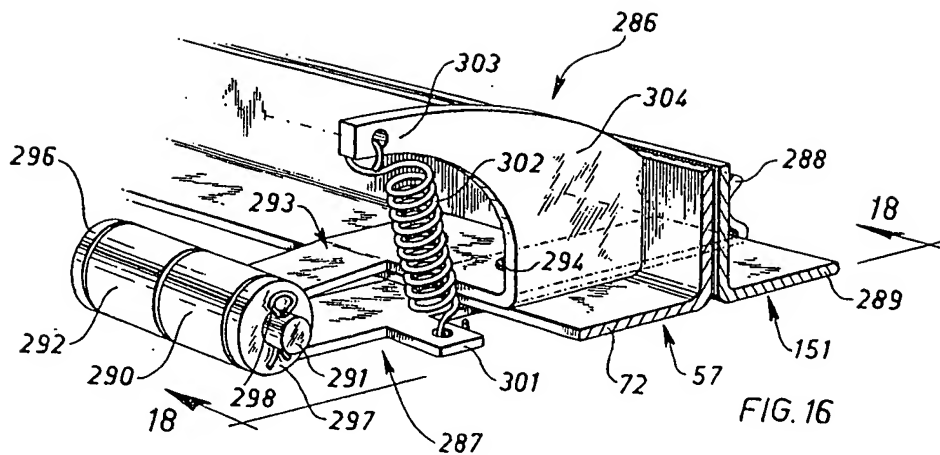
J. Noel Wallin



J. Noel Walton



J. Noel Hall



J. Nail Walton

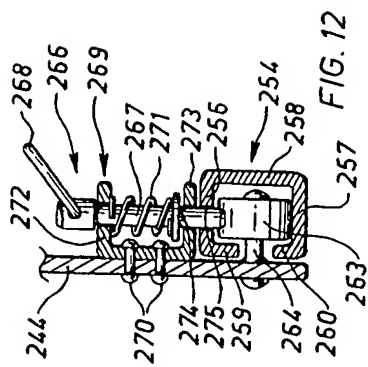


FIG. 12

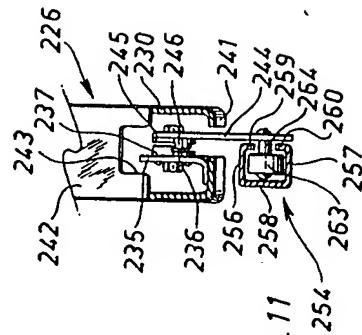


FIG. 11

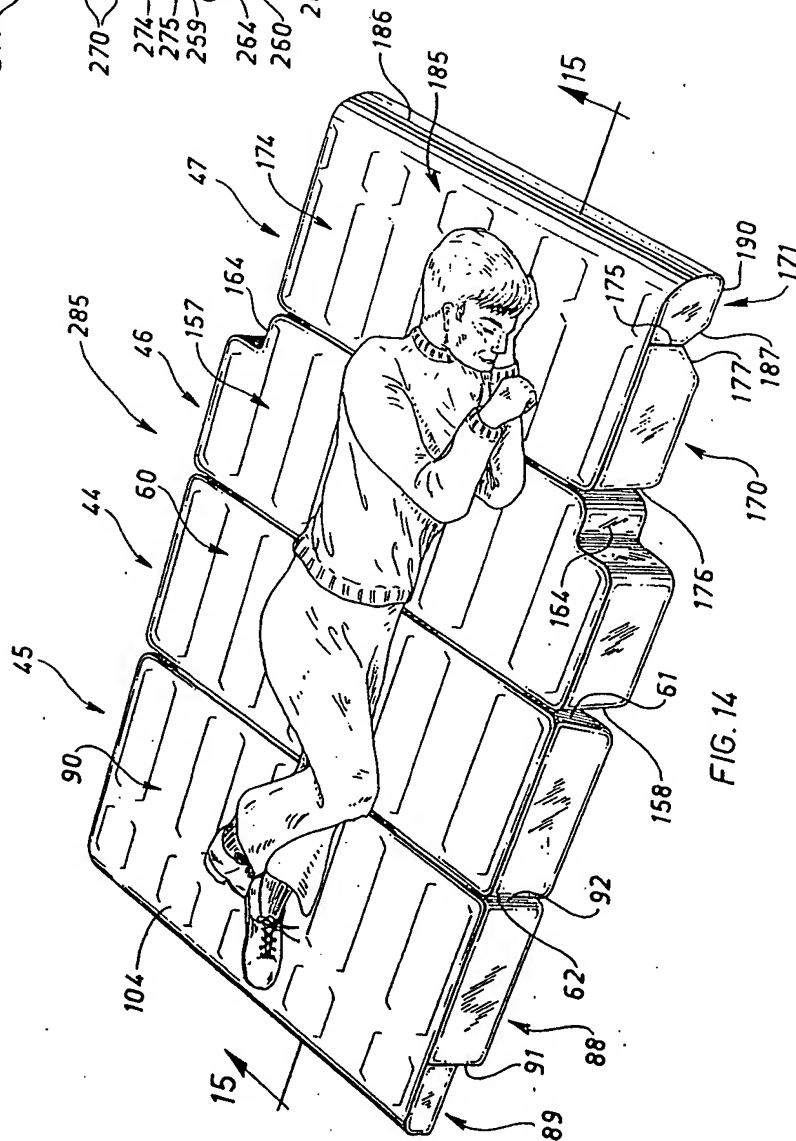


FIG. 14

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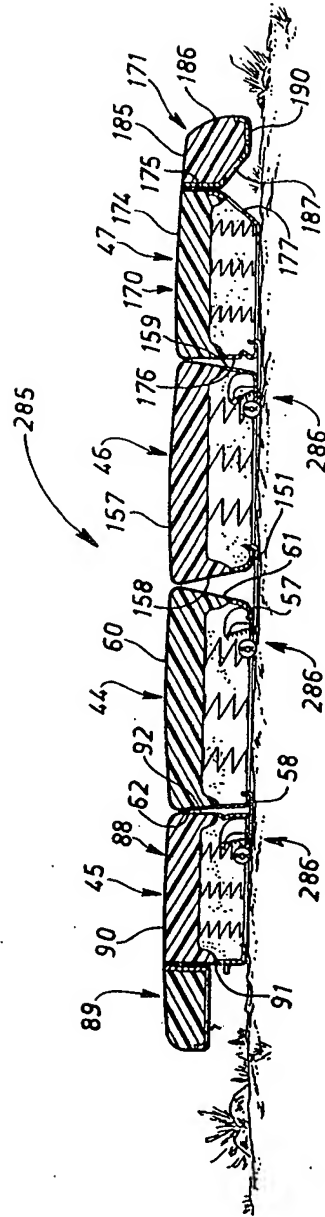


FIG. 15

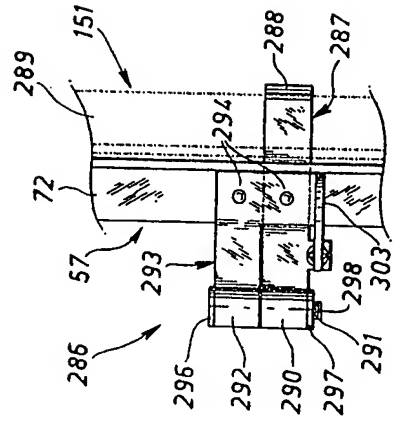


FIG. 17

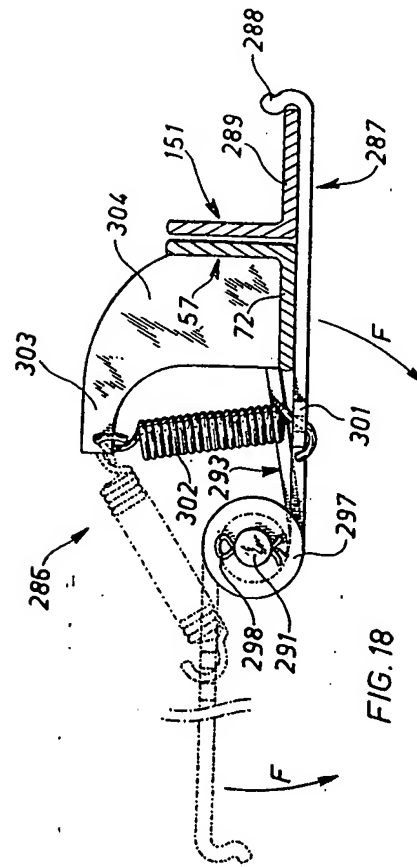
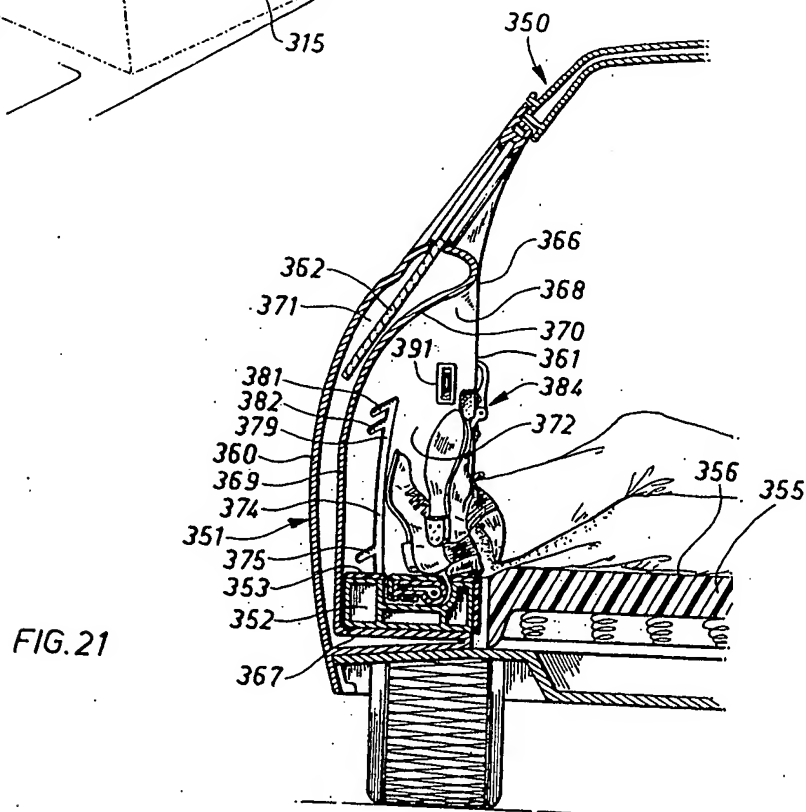
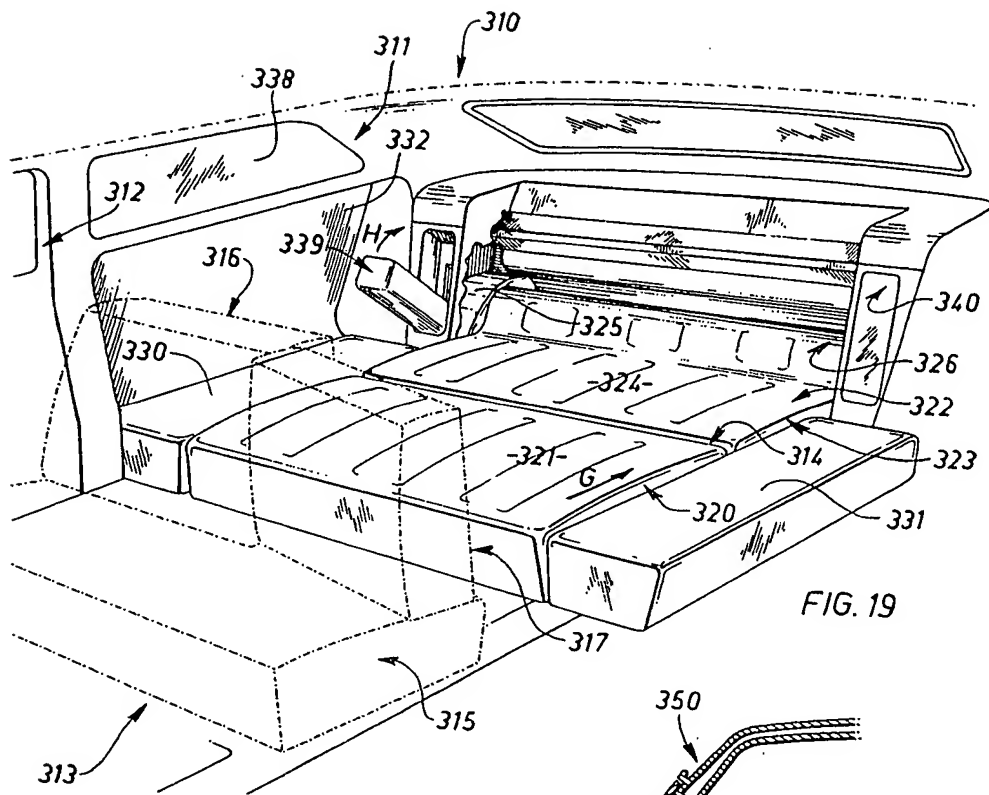


FIG. 18

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FIG. 22

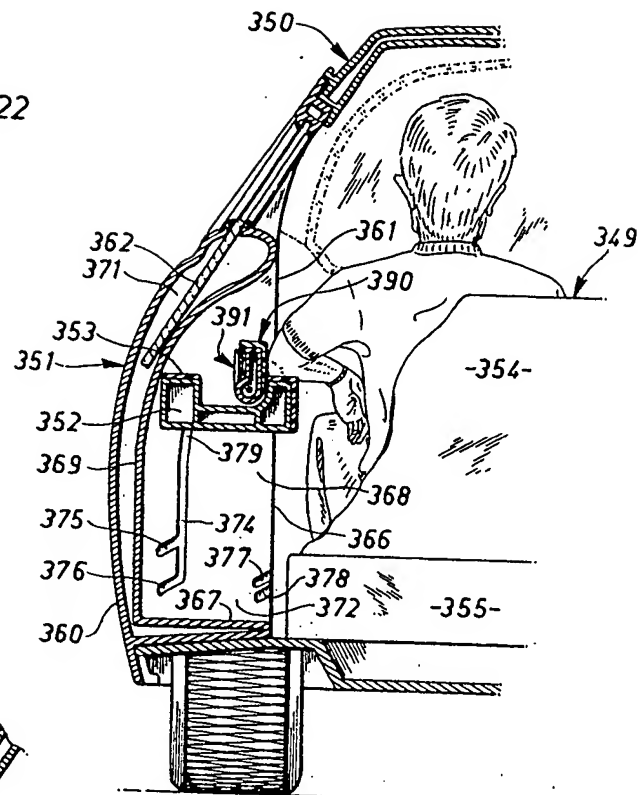
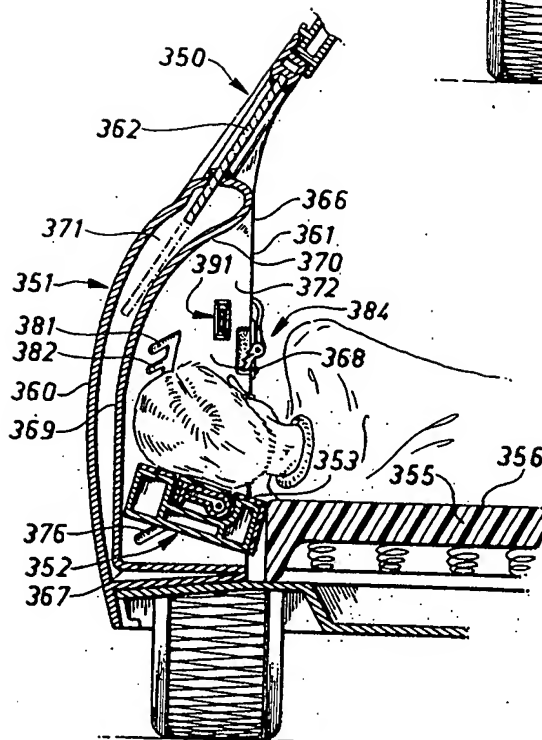
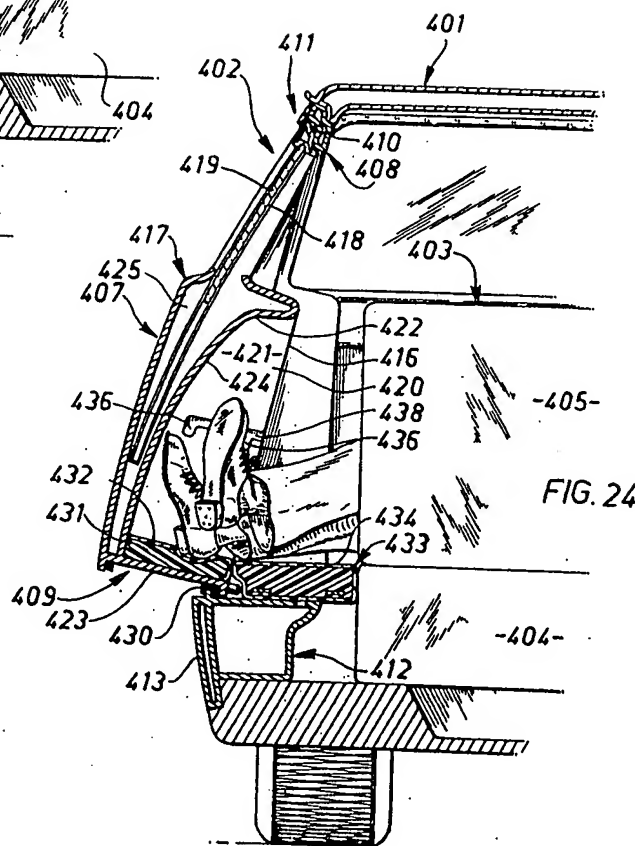
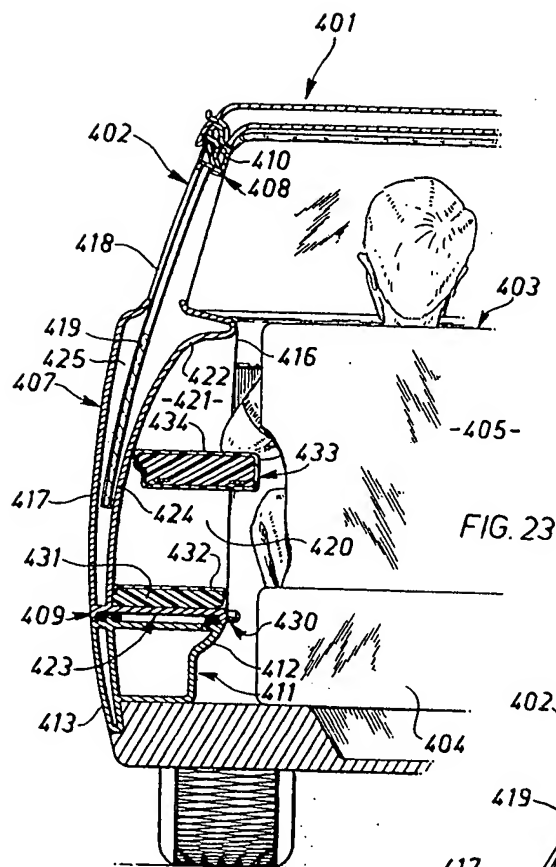


FIG. 20



J. Noel Walton





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